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CORRIDOR STRATEGIES: THE INTEGRATION OF THE SOUTHERN AFRICAN CONTAINER PORT HUBS AND INTERMEDIATE HUBS WITH PORT HINTERLANDS.

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ABSTRACT

The past decade has seen significant competition and cooperation between regional port gateways, hub and intermediate hub container ports. New ports entering the market and existing ports expanding their handling capacity have also intensified the competitive dynamics between corridors linking ports to continental hinterlands.

The knowledge of the competitive position ranking of a corridor, together with the characteristics which make a corridor competitive can provide stakeholders with appropriate strategies/action plans of how to increase a corridor's attractiveness and improve/maintain the corridors competitive position. Currently, little empirical research exists for assessing the competitive position of a corridor in a given port system based on best practice corridor theoretical principals.

This paper focuses on regional hinterland competitive dynamics in container port corridor supply chain nodes. The study combines the corporate strategy concept of resource and capability appraisal (Grant, 2009), together with various theoretical principles of corridor attractiveness. The objective of the adapted resource and capability corridor appraisal achieves the goal of developing a sound and empirical framework for a competitive rank assessment of competing corridors in a given container port system. The proposed methodological framework serve as the theoretical foundation for a planned empirical application to assess the competitiveness of rail corridors in southern Africa.

As such, the paper contributes to advancing and broadening the methodological discussion on corridors and hinterland port system competitiveness and development.

Key Words: Corridors, Corridor Competition, Resources and Capabilities

1. Introduction

The significant growth in container traffic in the past decades has driven competition and cooperation between regional container port gateways, hubs and intermediate hubs. New ports entering the market and existing ports expanding their handling capacity are intensifying competitive dynamics. This has also to some extent been the catalyst for competition along hinterland corridors in a given port system.

Researchers have published conceptual approaches on corridors for example with respect to corridor strategies (Notteboom, 2012), corridor best practices (Arnold et al., 2005), corridor co-ordination (Van Der Horst & De Langen, 2008) and the integration of port gateways and corridors (Notteboom and Rodrigue, 2005). Detailed empirical approaches for assessing the competitive position of a corridor in a given port system are to a great extent lacking, particularly when focusing on an approach based on best practice corridor theoretical principles.

The objective of this paper is to provide a sound methodology to determine the competitive position ranking of each corridor in a given port system. In general, the principles of competitive analysis are largely confined to the management sciences. These principles however can be adapted and applied to port and economic studies (in this case, rail corridors for containerized cargo between seaports and inland ports). This paper combines the corporate strategy concept of resource and capability appraisal, together with the principles of corridor attractiveness. This has been done in order to develop a sound and empirical framework for a competitive rank assessment of competing corridors linking a given container port system to a specific hinterland service area. The framework developed forms the basis for a future empirical application on the container port system and hinterland areas in southern Africa.

This paper is arranged as follows; first a theoretical framework of container port hubs, intermediate hubs and corridors grounds the study. This is followed by a discussion of the dimensions of corridor attractiveness from three perspectives (infrastructure, logistics and management). Third, the corporate strategy model of resource and capability appraisal is introduced and adapted to the port and corridor perspective. Finally, a five step methodology for the appraisal of corridors in a given port system is outlined and a case for its application (future research) is put forward.

2. Theoretical background on corridors, gateways, hubs and hinterlands

The literature reviewed for the purpose of this research is focused on theoretical views on corridor strategies, container port hubs/intermediate hubs and their integration into contestable continental hinterlands.

2.1 Hubs, intermediacy and hinterlands

The size and capital intensity of modern containerships has driven shipping lines to limit the number of ports of call to (in some cases) 'hub' or intermediate ports hubs. Containers from such hubs or intermediate hubs are then further forwarded (fed) with smaller vessels to other ports or delivered into the continental hinterland via a corridor (rail, road or barge).

According to Aversa et al. (2005) hubs are facilities that serve as transhipment or switching points (e.g. in telecommunications), functioning as connection centers among several origins and destinations. In the glossary of Transport Geography, Rodrigue (2012) describes intermediacy as a focus on the terminal as an intermediate point in the flows of passengers or freight. Fleming and Hayuth (1994) pointed out that intermediate locations can emerge between origins and destinations. Intermediate nodes are added to a network when considered appropriate by the network operators in view of overall performance of the network. Intermediacy typically improves the overall network connectivity and service frequency, allows better use of economies of scale in transport equipment and generates additional cargo handling in the network. Intermediacy has become increasingly prevalent in container liner shipping.

Gateways are in a unique position to stimulate intermodal transport and use intermodal systems as a tool to enlarge their hinterlands. Gateways are nodal points, where intercontinental transport flows are being transshipped onto continental axes and vice versa (Van Klink and Van den Berg, 1998). According to Notteboom and Rodrigue (2005) and Rodrigue and Notteboom (2010), in the sixth phase of the spatial development of port systems (regionalization), gateways achieve a higher level of synchronization with their hinterlands through specialized high capacity corridors of circulation serviced by rail or barges. In relation to corridors, Arnald et al. (2005) stipulates that activity at the end of an international gateway can be increased through the development of a corridor.

Early works have defined hinterlands as the area of where the greater part of the trade cargo passes through the port (Barke, 1986; Blumenhagen, 1981; Sargent, 1938; Weigend, 1958). Van Klink (1998) describes a seaport's hinterland as the continental area of origin and destination of traffic flows through a port. In other words, it is the interior region served by the port. The hinterland potential of a port is also dynamic. It can change due to fundamental developments in technology, economy and society, which have an impact on the demand of shippers for port services as well as on generalized transport costs. De Langen (2007) distinguishes between captive and contestable hinterlands. This is between primary hinterlands, the area where the port is well established and secondary hinterlands, with rivalry

among ports.

2.2 Corridors to the Hinterland

The corridor is the main paradigm of inland accessibility as it is through major axes that port terminals gain access to the inland distribution systems (Notteboom and Rodrigue, 2005). Rodrigue (2012) defines a corridor as a linear orientation of transport routes and flows, connecting important locations that act as origins, destinations or points of transshipment. Corridors are multi-scalar entities depending on what types of flows is being investigated. Thus, they can be composed of streets, highways, transit routes, rail lines, maritime lines, or air paths. A freight corridor is a linear orientation of freight flows supported by an accumulation of transport infrastructures and activities servicing these flows. Flows can be divided by mode and by the infrastructure servicing them. Corridors have become the object of intense modal competition with the growth of movements of passengers and freight. Freight corridors are the dominant convergence paradigm of urbanization integrating global, regional and local transportation and economic processes in a geography of distribution. (Rodrigue, 2004)

Table 1 (provides an overview of the three types of corridors in terms of the corridors role and service offering.

Type Corridor	Service Area	Example
Domestic	Designated route within the national transport network.	Primarily used to distribute goods within a country
Transit	Transport the cargo of other countries. Bounded by border crossings.	Promote regional integration and economic cooperation between neighboring states.
Foreign	Primarily to transport the imports and exports of a country.	Either an endpoint at a gateway/border crossing or internal facility for clearing cargo.
Hybrid	A combination of the three.	

Table 1: Types of Corridors

Source: adapted from Arnold et al., 2005

Corridor development is an important aspect ensuring the sustainability of corridor use. Such developments enhance the polarization and zoning of logistics sites in transport nodes (seaports and inland ports) and along the axes between seaports and inland ports (Notteboom and Rodrigue, 2005). Figure 1 provides the principle development objectives of corridors, which are centered around the development of economic activities along the corridor, the increase of activities at the gateways, the facilitation of bilateral trade between regions and countries and the provision of access to landlocked regions and countries.

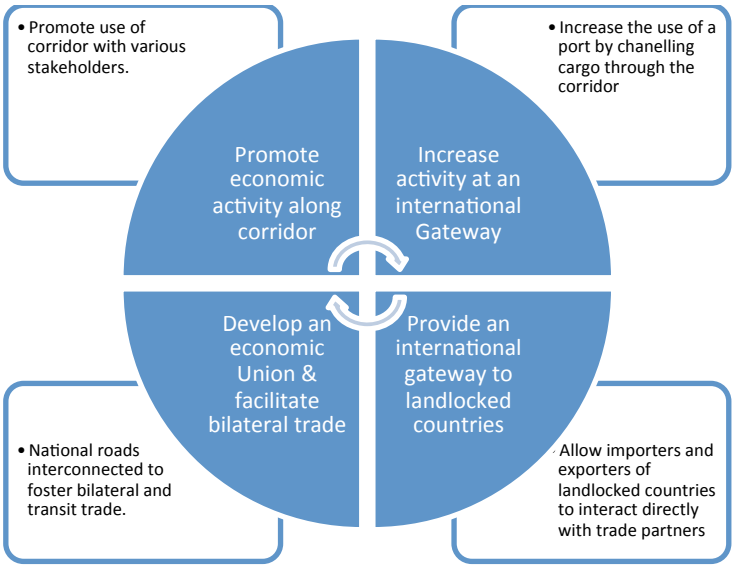

Figure 1: Development Objectives of Corridors

Source: adapted from Arnold et al. (2005)

3. Attributes of Corridor Attractiveness

In the previous section we defined corridors in the context of gateway or hub ports and described the importance for the flow of goods in the supply chain. This section identifies the main attributes and dimensions of a corridor which make it attractive and competitive.

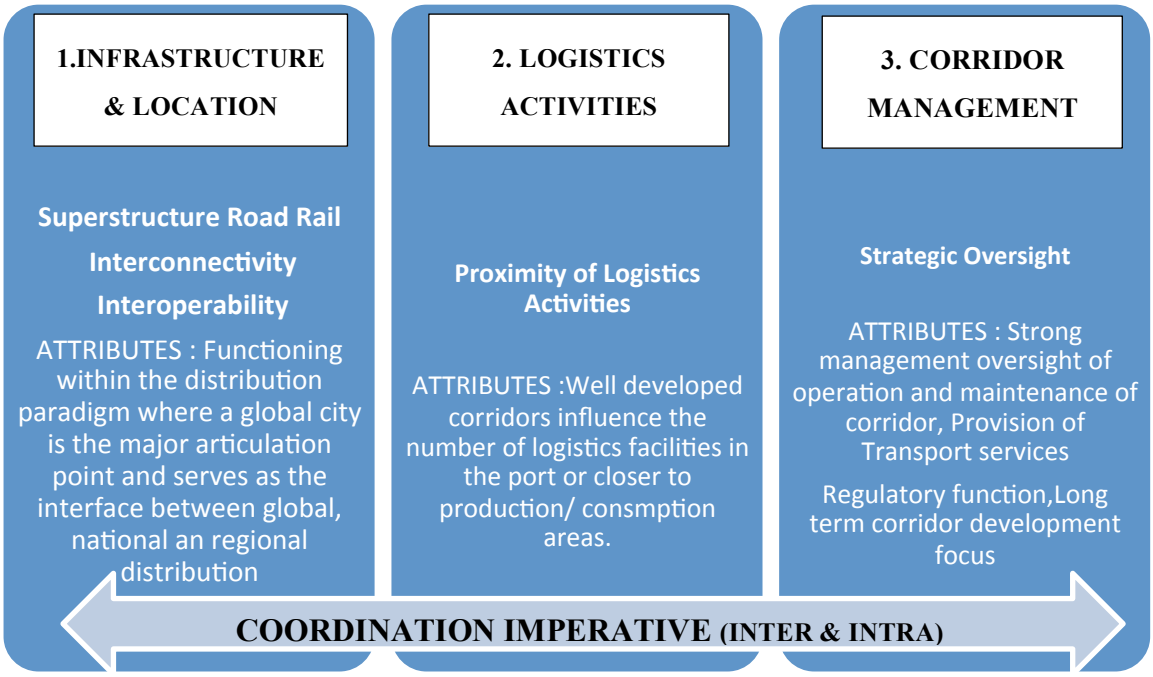

Figure 2: Three Dimensions of Corridor Attractiveness

Arnold et al. (2005) evaluates a corridor's performance from three perspectives. Firstly, the corridor's physical infrastructure i.e. the physical capacity of the links and nodes including the level of utilization of the corridor. Secondly, the quality of services provided for the goods moving along the corridor. The performance at the level of the quality of service has time and cost dimensions linked to specific links and nodes. The third performance perspective is the movement of goods in the corridor. This similarly has a time and cost perspective, however, these variables are disaggregated for transport services on the links and the processing services at the nodes of the corridor.

Figure 2 combines insights from Arnold et al. (2005), Rodrigue and Notteboom (2010), Rodrigue (2004) and Van Der Horst & De Langen (2008) in order to depict the three dimensions of a corridor which make it attractive and competitive.

Firstly, within the infrastructure and location dimension are the road, rail and barge infrastructure (condition and capacity), and at the level of interconnectivity between nodes (border crossings, customs and inspection procedures). Other imperatives to the infrastructure dimension of a corridor are the level of interoperability and interconnectivity. This refers to (1) transport services having standardized technical requirements (i.e. rail gauge or road weight restrictions) and (2) interfacing seamlessly from one transport mode to another along a single corridor.

The second dimension is the corridor logistics activities such as warehouses and inland terminals. This associates the extent to which a corridor is developed in order to influence the number of logistics facilities in the port or consumption and production areas in the hinterland.

Dimensions one and two (infrastructure/location and logistics activities) are both

corridor resources. Resources however, 'are not productive on their own' (Grant 2009:135). The third dimension is that of corridor management attributes which can be categorized mainly as a capability which makes a corridor attractive in conjunction with the infrastructure and logistics resources. Such capabilities include: strong management oversight of the operation and maintenance of a corridor, sound long-term strategic development planning, oversight of regulatory procedures affecting the movement of goods and a balanced stakeholder management structure which includes public private partnerships coordinating the effective functioning of the corridor.

Finally, each dimension requires coordination both at an inter- and intra-corridor dimension. This also can be categorized as a corridor capability requirement within and across each dimension of the corridor attractiveness framework. Van Der Horst and De Langen (2008) state that the creation of effective hinterland transport chains requires coordination between all actors, which does not come spontaneously. This implies a need for all corridor actors within each dimension to develop mechanisms to enhance coordination. These mechanisms include the introduction of incentives, the creation of inter-firm alliances, changing the scope, and the creation of collective action.

4. Adapted Resource Capability Analysis Model for competitive analysis: A Framework to assess a corridors competitive position

The resource and capability (hereafter referred to as R & C) approach/model is a strategic appraisal analysis tool developed by Grant (2009). The model is used in order to identify a firm's key weaknesses and key strengths which are of strategic importance to the industry in which the firm operates. With reference to figure 3, key strengths (R1 and C1) can then be further strengthened and weaknesses (R2 and R3) should be reduced or eliminated. The model also identifies superfluous strengths which are irrelevant and which could be distracting the firm from directing its resources and capabilities into more strategically important.

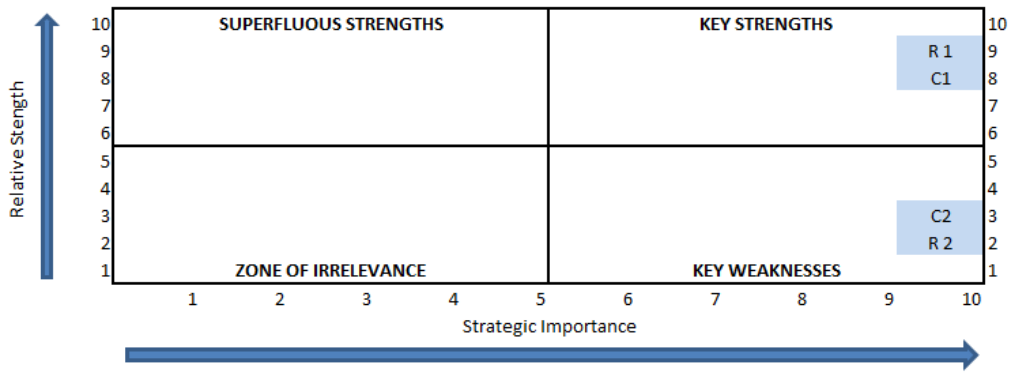

Figure 3: Resource and Capability Appraisal. (adapted from Grant, 2009)

From a corridor perspective, the R & C model can also be applied in order to strategically appraise the level of attractiveness and competitiveness of corridors contesting the same hinterlands. To do so however, the following information

would need to be identified:

1. Resources and capabilities applicable to corridors based on the theoretical framework of corridor attractiveness (figure 2)
2. The relative importance or weight of each of the identified resources and capabilities based on stakeholders' perception
3. An industry importance rating of each corridor on each of the identified resources and capabilities.

In this paper, the evaluation procedure for a complete corridor resource and capability analysis and competitive appraisal is completed following a five step methodology. The technique does however have two key assumptions: (1) The corridors are connected to one port system, and (2) the corridors all have different start nodes (a port) but one central end node, i.e. an inland (rail) port in the core or proximity of a key hinterland region. Essentially there is a convergence of different start nodes/gateways to one central end node in the network. The proposed analysis thus comes down to an assessment of the attractiveness/competitiveness of specific corridor/gateway combinations in serving a shared hinterland region via the same inland platform. In the next paragraphs we discuss the proposed five-step methodology in more detail.

Step 1: Identification of the main corridor resources and capability categories:
Grant (2009) broadly categorizes resources as follows: financial, technological, plant equipment and location, distribution and brand. In the context of corridors and based on the dimensions of corridor attractiveness (figure 2), corridor resources can be aligned to the broad categories but applied to a corridor context as per table 2.

Table 2 : Corridor Resources

Resource Category	Resources Applicable to Corridors
1. Finance	Financial Resources of corridor management structure.
2. Technological	ICT systems i.e. regional cargo tracking system, (national single window corridor community system) and or cargo community systems
3. Infrastructure	Capacity and condition of the road and rail infrastructure (links) Road and rail distances to major production and consumption centre.
4. Location	Level of accessibility to logistics zones.
5. Distribution Network	Existence of an interface between the port operator, rail provider and road hauler carriers. Logistics activities including warehouses and inland terminals.
6. Brand	Strength and level of faith in the Corridor governing structure.

Similarly, with respect to capabilities, the broad categories within the dimension of

corridor attractiveness are presented in table 3, effectively identifying the critical corridor capabilities.

Table 3 : Corridor Capabilities

Capability Category	Capability Applicable to Corridors
1. Operational Capability	Transit times by Corridor in days (Efficiencies) i. From start node (port) to end node (inland terminal) or vice versa. ii. Transit times along corridor. iii. Reliability of services provided.
2. Management Capability	Corridor Management capability coordinating: i. Port corridor interface ii. Rail corridor interface iii. Road/Rail/Port interface
3. Research and Development	Capital plan for maintaining and expanding operations.
4. Financial Management	Funding mechanism/ Capability of Corridor Group.
5. Stakeholder Integration	Extent of Port Authority involvement- i. Across all three dimensions of the corridor, management, infrastructure and logistics activities. ii. Harmonised customs between cross border countries along the corridor.
6. Regulatory	Level of compliance to regulations (i.e. road weight) etc..

Step 2: Identification of subcategories, measures and establishing relative importance weights for each.

The next step involves refining all of the broad corridor R & C into tangible variables which could be easily rated per corridor by respondents on a five-point Likert scale. In addition to rating the strength of the R & C, the relative importance of the variable being evaluated would also be required (i.e. the weights of each variable). This is a critical step in determining if the corridor resource or capability (identified through theoretical literature) is indeed important to industry players. The relative importance measurement will also rank the most critical corridor resources and capabilities for industry from the three dimensional corridor attractiveness framework.

Table 4 provides the elements of the resources questionnaire together with an explanation of each variable which will be rated from a strength and importance perspective.

Table 4: Corridor Resource Categories and measures

Code	Resource	Measure	Likert Strength Rating (specific rating for each corridor being examined)	Likert Importance Rating for attractiveness/competitiveness of non-specific corridors in the region
R1	Financial Resources of corridor structure.	Terms of reference for contributions by stakeholders to the corridor management structure and structure budget.	1 to 5 1- unstructured guidelines and support for contributions 5- Structured guidelines for contributions and Very High support to budget.	1 to 5 1- Low importance 5- High importance
R2	Regional cargo tracking system (National single window corridor community system)	(1) Existence of such a system and (2) number of active users.	1 to 5 1- poor ICT system with few users 5- Very efficient ICT system with many active users	1-5 1- Low importance 5- High importance
R3	Capacity and Condition of the Road infrastructure (links)	Sufficient road capacity.	1 to 5 1- Very Low capacity 5- Very High capacity	1-5 1- Low importance 5- High importance
R4	Capacity and Condition of the rail infrastructure (links)	Sufficient rail capacity.	1 to 5 1- Very Low capacity 5- Very High capacity	1-5 1- Low importance 5- High importance
R5	Road and Rail distances to major production and consumption centre	Competitive rail and road distances based on geographical position.	1 to 5 1- Distances too great - uncompetitive 5- Short distances, very competitive	1-5 1- Low importance 5- High importance
R6	Level of accessibility to logistics zones.	The corridor is in close proximity to and provides a high accessibility to logistics zones in the port or inland terminal	1 to 5 1- Very Low accessibility 5- Very High accessibility	1-5 1- Low importance 5- High importance
R7	Existence of an active interface between the	An active interface between rail and port to	1 to 5 1- Very Low and ineffective active interface.	1-5 1- Low importance 5- High importance

	port operator and rail operator.	facilitate better co-ordination of activities between the two.	5- Very High and effective interface.	
R8	Existence of an active interface between the port operator and road hauliers.	An active interface between the port and road hauliers to facilitate better co-ordination of activities between the two modes.	2 to 5 1- Very Low and ineffective active interface. 5- Very High and effective interface.	1-5 1- Low importance 5- High importance
R9	Existence of an active interface between all mode operators port operator, rail provider and road hauliers.	An active interface between the port and road hauliers to facilitate better co-ordination of activities between the two modes.	3 to 5 1- Very Low and ineffective active interface. 5- Very High and effective interface.	1-5 1- Low importance 5- High importance
R10	Brand	Strength and level of faith in the corridor governing structure.	4 to 5 1- Very low level of faith in corridor governing structure. 5- Very high level of faith in corridor governing structure.	1-5 1- Low importance 5- High importance

Table 5 provides the elements of the resources questionnaire together with an explanation of each variable which will be rated per corridor under consideration from a strength and importance perspective.

Table5: Corridor Capability Categories and Measures

Code	Capability Category	Measure	Likert Strength Rating (specific rating for each corridor being examined)	Likert Importance Rating for attractiveness/competitiveness of non-specific corridors in the region
C1	Operational Capability Road	Reliability of average transit times from start node (port) to end node (inland terminal) or vice versa. *Road*	1 to 5 1- Very Low 5- Very High	1 to 5 1- Low importance 5- High importance
C2		Reliability of average transit times from start node (port) to end node (inland terminal) or vice versa. *Rail*	1 to 5 1- Very Low Reliability 5- Very High Reliability	1-5 1- Low importance 5- High importance
C3		Reliability of transit times along corridor. *Road.*	1 to 5 1- Very Low Reliability 5- Very High Reliability	1-5 1- Low importance 5- High importance
C4		Reliability of transit times along corridor. *Rail.*	5 to 5 1- Very Low Reliability 5- Very High Reliability	1-5 1- Low importance 5- High importance
C5	Operational Coordination	Port operator and rail operator coordination along corridor.	1 to 5 1- Very Low Co-ordination 5- Very High Co-ordination	1-5 1- Low importance 5- High importance
C6		Port and road haulage coordination.	1 to 5 1- Very Low Co-ordination 5- Very High Co-ordination	1-5 1- Low importance 5- High importance
C7		Start node to end node coordination (port to inland terminal) and vice versa.	1 to 5 1- Very Low Co-ordination 5- Very High Co-ordination	1-5 1- Low importance 5- High importance
C8	Level of Stakeholder Integration and coordination	Extent of Port Authority involvement (co-ordination and integration)	1 to 5 1- Very Low degree of Involvement 5- Very High degree of Involvement	1-5 1- Low importance 5- High importance

		with the corridor, across all three dimensions of the corridor, management, infrastructure and logistics activities.		
C9	Level of Customs Administrative Simplicity.	Harmonized (standardized) customs procedures between cross border countries along the corridor.	1 to 5 1- Very Low customs Harmonization 5- Very High customs Harmonization	1-5 1- Low importance 5- High importance
C10	Level of compliance to regulations		1 to 5 1- Very Low 5- Very High	1-5 1- Low importance 5- High importance
C11	Capital plan for maintaining and expanding operations	Carefully considered long term capital plan for the expansion and maintenance of corridor infrastructure.	1 to 5 1- Poor or absence of plan 5- Very well developed and realistic plan	1-5 1- Low importance 5- High importance

Step 3: Development of the questionnaire and selection of research technique.

Having established academically sound and relevant key corridor resources and capabilities, the next step would be to determine a Likert rating score in respect of each individual corridor using a questionnaire. Scoring will be two fold, (1) a Likert score for the attractiveness/competitiveness each corridor on every variable from table 4 and 5 (corridor specific), and (2) a Likert score for the level of importance of each variable to the industry (corridor non-specific). An appropriate technique to achieve this would be the application of the Delphi technique. MacCarthy and Atthirawong, (2003) define the Delphi technique as a systematic, iterative process to elicit a consensus view from a panel of experts. In this case, the consensus or objective sought from the panel of experts is a corridor competitive position rank within a port system given all the identified resources and capabilities which make a corridor attractive. The Delphi approach is often used as a qualitative forecasting technique but can also be used to investigate and understand the factors that influence or may influence decision-making on a specific issue, topic or problem area.

The Delphi technique has been chosen as the data collection strategy for this study for the

following reasons. First, it is a particularly good research method to obtain scores for each of the corridor resource and capability attributes and their importance from an expert panel. Second, single opinion (scoring) may be incorrect, misinformed or tend to a narrow view. The Delphi approach uses a representative group of experts to generate a more accurate and complete response than is obtainable from one individual. Third, the Delphi technique is also a prescribed methodology for cases when participants hail from different professions (in this case different corridor stakeholders), because anonymity provides a layer of protection for individual voices (Melpignano and Collins, 2003). Finally, the technique has demonstrated both reliability and validity. For example, according to Ono and Wedemeyer (1994) the results of a forecasting communication study conducted 16 years earlier were consistent with a replicated Delphi study's present findings.

Step 4: Selecting an expert panel of stakeholders' directly affected (Delphi method)

The objective of this study is to determine an accurate and complete methodology for the competitiveness of a corridor based on the knowledge and opinion of stakeholders with a broad and cross-sectoral perspective on a corridors strengths and importance. The expert panel therefore has to have representation from the key corridor industry stakeholders. The selected panel members were identified as stakeholders from industry who own, manage, operate or use the resources and capabilities (based on table 2 and 3) of each corridor selected for appraisal. A total of 10 stakeholders are categorized for each corridor as follows:

Title of Expert	Industry Field Expertise
1. Planning Manager - Container Terminal	Container Operations Co-ordination
2. Operational Manager – Container Terminal	Container Operations – execution
3. Operational Manager – Rail	Rail operations – Execution
4. Corporate Strategy Manager – Port Authority	Port
5. Corporate Strategy Manager – Rail	Rail operations – Execution and integration
6. Road Haulage Association Chairman	Customer - Road Haulage operation and co-ordination
7. Corporate Strategy Manager – Corridor	Corridor Oversight
8. Major Port node Warehouse logistics Manager	Customer – freight corridor
9. Major Inland node Warehouse logistics Manager	Customer – freight corridor
10. Major shipping line	Customer – freight corridor

The panel is represented by an expert within each of the three dimensions of corridor attractiveness (figure 2) namely:

1. Infrastructure resource owners and operators (Port, port operator, rail operator and road haulers)
2. Logistics providers (Warehouse logistics managers and shipping line)
3. Management Activities (corporate strategy manager Road, Rail, Corridor, shipping line, Warehouse logistics manager, Road haulage chairman)

The study will be conducted in strict confidence throughout and anonymity guaranteed to respondents in order to safeguard the integrity of the findings.

Step 5: Analytical Process: Application of AHP for Analysis and Discussions.

Following the completion of the questionnaires by the panel of experts, the data will then require capture, synthesizing and analyzing. This will be completed using the Analytical Hierarchy Process. The Analytical hierarchy process (AHP) is a decision aiding method aimed at quantifying relative priorities for a given set of alternatives on a ration scale (Kamal et al., 2001 and Almotari and Lumsden, 2009). AHP has been widely applied in research across all disciplines including, project management (Kamal et al., 2001), environmental policy economics (Kurttilaa et al., 2000) and maritime economics (see e.g. Lirn et al., 2004; Notteboom, 2011).

The possible advantages of using AHP in a corridor resource and capability appraisal lie in the quantitative examination of the qualitative resource and capability factors with the inclusion of the relative importance factor for decision makers (respondents).

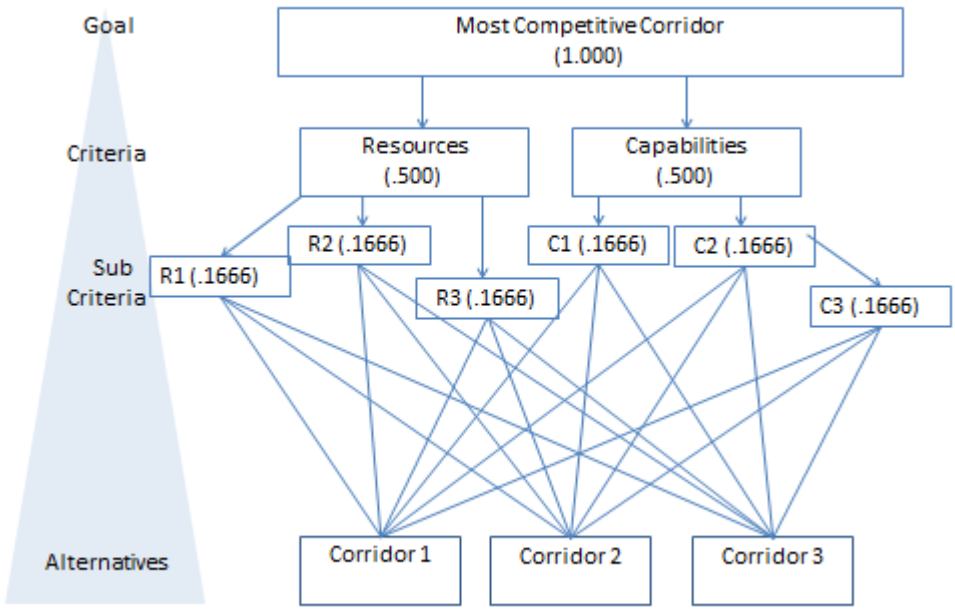

Figure 4: Corridor Competitive Resource and Capability Hierarchical Model – example of hierarchy, (figures relate to hypothetical relative weights)

Figure 4 is a graphical illustration of AHP applied to a corridor assessment using the resource and capability (R & C) approach. The goal or overall objective is the determination of the most competitive corridor in a given port system based on R & C criteria (the sum of all R & C) and sub-criteria (specific R & C derived from table 4 and 5). To illustrate quantitatively, the priority (importance) of the goal (the most competitive corridor) equals a value of 1 and the sum of weights of all criteria must always add up to 1. The AHP approach essentially involves decomposing a complex and unstructured problem

into a set of components organized in a multi-level hierarchical form (Notteboom, 2011). Once the R & C AHP analysis has been completed, decision makers will then have a complete view of a corridors competitive position overall and in relation to each criterion and sub-criterion. We intend to complete this process using HIPRE modeling software. The software generates an overall score for the R & C assessment of each corridor based on a combination of relative strength and industry importance (weight) scores for all R & C criteria and sub-criteria. The software also permits sensitivity analysis to simulate the impact of changes to the relative importance of criteria on the overall score for each corridor. Finally, the respondents scores could also dichotomized between that of an end user and service provider. This will provide perspective of the corridors competitive position from a user and service provider (i.e. a comparison on any correlation between what users and providers deem important R & C for the corridor).

5. Recommendation for Corridor competitive appraisal: a proposed application to the Southern African Port System

Section four provided a five step approach/methodology for the determination of the competitiveness of a corridor applying an adapted R & C approach based on the knowledge and opinion of stakeholders from a broad and cross-sectorial perspective. The next step would be the selection of a suitable case for the application of this methodology. Two assumptions of this competiveness test are as follows:

1. The corridor start/end node is a single port.
2. There is only one end/start node, a point at which all corridors converge.

Given these assumptions, a suitable study candidate for this competitive analysis is the Southern African container port system. The port system comprises six container ports linked by six corridors to one central production and consumption area, i.e. the Gauteng area with as main city Johannesburg.

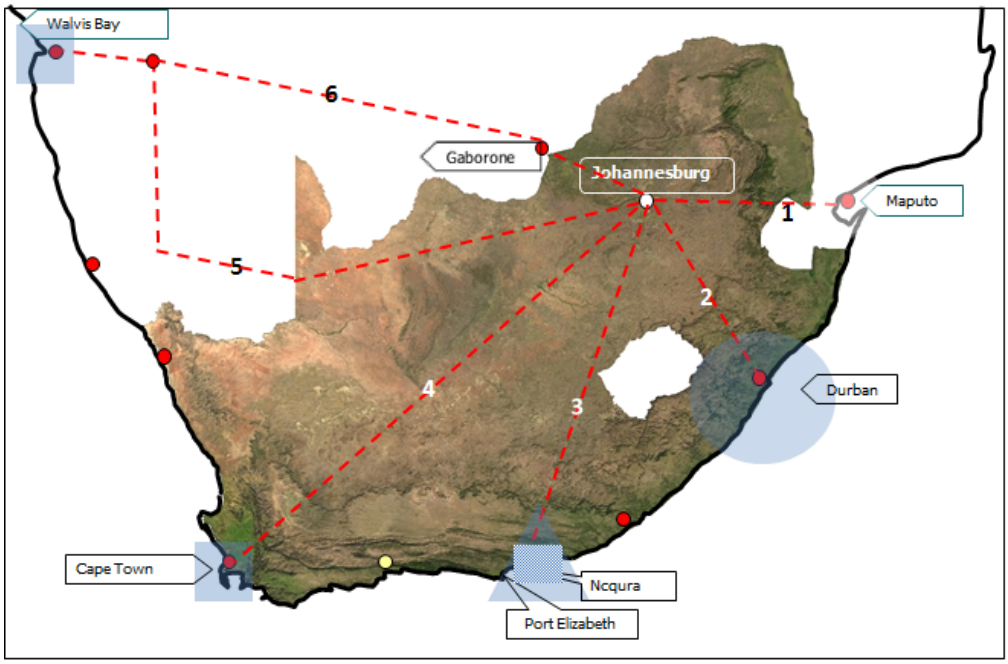

Figure 5: Southern African Container Port System and Corridors

(adapted from Google earth – corridors re approximations)

Figure 5 illustrates the six container ports in the container port system: Maputo, Durban, Nctqura, Port Elizabeth, Cape Town and Walvis Bay. Each port is linked by a rail corridor (1 to 6) to the City Deep rail terminal facility (or other applicable rail terminal) in the Gauteng area, the central production and consumption zone in the region, as the end/start node in the supply chain. The corridors are specified as follows :

i. Natcor – Durban to Johannesburg
ii. Maputo corridor – Maputo to Johannesburg
iii. Southcor – Port Elizabeth & Ncqura to Johannesburg
iv. Capecor – Cape Town to Johannesburg
v. Trans-Kalahari Corridor – Walvis Bay to Johannesburg
vi. Trans-Oranje Corridor – Walvis Bay to Johannesburg

Applying the five steps of section four, the most competitive corridor in the Southern African port system can be empirically determined based on the resource and capability framework.

6. Conclusion

This paper focused on regional hinterland competitive dynamics in container port corridor supply chain nodes. The study combines the corporate strategy concept of resource and capability appraisal (Grant, 2009), together with various theoretical principles of corridor attractiveness and competitiveness. The objective of the adapted resource and capability corridor appraisal achieves the goal of developing a sound and empirical framework for a competitive rank assessment of competing corridors in a given container port system.

The range of resources and capabilities presented in this paper serve as input to the determination of weights of each criterion of corridor competitiveness and the scores on each criterion for a set of competing corridors connecting a specific port system to a hinterland service area. The Delphi technique in combination with AHP was withheld as an appropriate method to collect the scores and weights of criteria and sub-criteria in view of obtaining an overall competitiveness score for each of the competing corridors. We believe that our study advances and broadens the methodological discussion on corridors and hinterland port system competitiveness and development.

We propose to apply the methodology presented in this paper to a set of rail corridors connecting key gateways in the southern Africa container port system to the Gauteng area in South Africa, the most important hinterland region in southern Africa in volume terms. The planned application should not only provide a greater understanding of the role of corridors in port competition in southern Africa, but should also support the validity of the proposed methodology. Also, we believe that the empirical results will complement earlier research on European, North American and Asian port corridor/hinterland systems in a way it will enrich the empirical discussion on corridors and hinterland port system competitiveness and development.

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